

Form Codes AECB, BWCB, DFCB

SAT Reasoning Test™

Question-and-Answer Service
May 2006 Administration

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INSIDE:

- The test questions that counted toward the critical reading, math, and writing scores on the SAT Reasoning Test
- Your essay prompt and all other essay prompts administered on test day
- The correct answers
- The difficulty level of each question
- The instructions for scoring your test

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SECTION 4

Time — 25 minutes

20 Questions

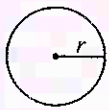
Turn to Section 4 (page 5) of your answer sheet to answer the questions in this section.

Directions: For this section, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. You may use any available space for scratchwork.

Notes

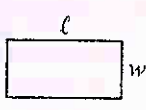
1. The use of a calculator is permitted.
2. All numbers used are real numbers.
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4. Unless otherwise specified, the domain of any function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number.

Reference Information

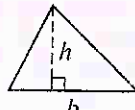


$$A = \pi r^2$$

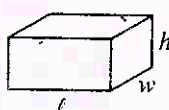
$$C = 2\pi r$$



$$A = \ell w$$



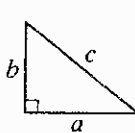
$$A = \frac{1}{2}bh$$



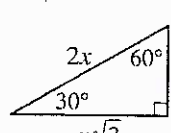
$$V = \ell wh$$



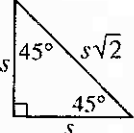
$$V = \pi r^2 h$$



$$c^2 = a^2 + b^2$$



Special Right Triangles

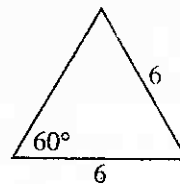


The number of degrees of arc in a circle is 360.

The sum of the measures in degrees of the angles of a triangle is 180.

1. Which of the following triples (x, y, z) does NOT satisfy the equation $\frac{xy}{z} = 6$?

- (A) (9, 2, 3)
(B) (6, 6, 6)
(C) (6, 4, 4)
(D) (6, 3, 2)
(E) (4, 3, 2)



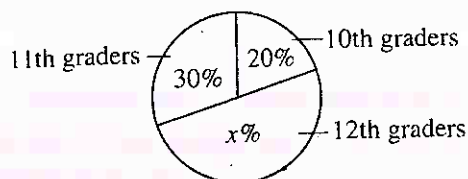
2. What is the perimeter of the triangle shown above?

- (A) 18
(B) 16
(C) 15
(D) 12
(E) 9

GO ON TO THE NEXT PAGE



DEBATING TEAM MEMBERSHIP



3. Based on the information in the graph above, what percent of the membership of the debating team is made up of 11th and 12th graders?

(A) 40%
(B) 50%
(C) 60%
(D) 70%
(E) 80%

4. Points P , Q , R , and S lie on a line in that order. Q is the midpoint of \overline{PR} . If the length of \overline{RS} is 3 and the length of \overline{PS} is 13, what is the length of \overline{QR} ?


(A) 5
(B) 6
(C) 8
(D) 9
(E) 10

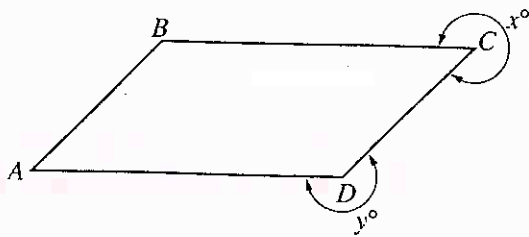
5. If three times a number x is twelve more than x , what is x ?

(A) 2
(B) 3
(C) 4
(D) 6
(E) 9

6. Today, Joaquín has 45 cents in his piggy bank and Marcy has 93 cents in her piggy bank. Starting tomorrow, Joaquín will add 6 cents to his bank each day and Marcy will add 4 cents to her bank each day. In how many days will the amount in Joaquín's bank first be greater than the amount in Marcy's bank?

(A) 5
(B) 15
(C) 20
(D) 25
(E) 58

GO ON TO THE NEXT PAGE 



Note: Figure not drawn to scale.

7. In the figure above, $ABCD$ is a parallelogram. If $x = 300$, what is the value of y ?

(A) 200
(B) 240
(C) 280
(D) 320
(E) 330

8. If $xy = 2$, $yz = 5$, $xz = 10$, and $x > 0$, then $xyz =$

(A) 5
(B) 10
(C) 17
(D) 50
(E) 100

	x	y	x	y	x
m					
m					
m					
m					

9. In the figure above, all angles are right angles and $y = 2x$. If m , x , and y are lengths of the segments indicated, what fraction of the figure is shaded?

(A) $\frac{1}{7}$
(B) $\frac{1}{5}$
(C) $\frac{3}{14}$
(D) $\frac{3}{10}$
(E) $\frac{5}{14}$

10. When a certain odd number is divided by 5, the remainder is 1. Which digit must be in the units place of this odd number?

(A) 1
(B) 3
(C) 5
(D) 7
(E) 9

GO ON TO THE NEXT PAGE 

11. Let the functions f , g , and h be defined by $f(x) = x^2$, $g(x) = x$, and $h(x) = f(x) - g(x)$. For $x > 10$, which of the following describes what happens to h as x gets farther from 10?

- (A) h increases only.
- (B) h decreases only.
- (C) h stays the same.
- (D) h decreases at first and then increases.
- (E) h increases at first and then decreases.

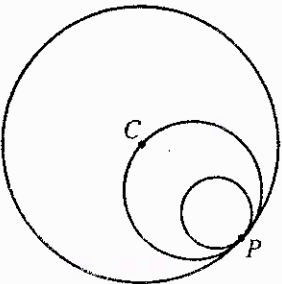
If x is an integer between 2,000 and 2,016 and if the sum of the digits of x is even, then x must be even.

13. Which of the following is one possible value of x that proves that the statement above is FALSE?

- (A) 2,008
- (B) 2,009
- (C) 2,010
- (D) 2,011
- (E) 2,012

12. A certain physical fitness test lasts a total of 3 hours. Each part of the test requires the same amount of time, and 12-minute breaks are included between consecutive parts. If there are a total of 3 breaks during the 3 hours, what is the required time, in minutes, for each part of the test?

- (A) 33
- (B) 36
- (C) 38
- (D) 45
- (E) 48



14. The centers of the three circles above lie on segment \overline{CP} (not shown), and the three circles are mutually tangent at point P . The center of the largest circle is point C , and the center of the middle circle lies on the smallest circle. If the radius of the smallest circle is 5, what is the circumference of the largest circle?

- (A) 10π
- (B) 20π
- (C) 30π
- (D) 40π
- (E) 60π



15. Let a "prd" number be defined as one in which the product of the positive divisors of the number, not including the number itself, is greater than the number. Which of the following is a prd number?
- (A) 8
(B) 15
(C) 18
(D) 21
(E) 27
-
16. If $k^2x = kx$ for every value of x , what are all possible values of k ?
- (A) 0 only
(B) 1 only
(C) 0 or 1 only
(D) 1 or -1 only
(E) 0, 1, or -1
-
17. Tickets for a community play cost \$2.00 for a child and \$4.00 for an adult. If 200 tickets were sold for a total of \$700, what was the ratio of the number of children's tickets sold to the number of adults' tickets sold?
- (A) 1 to 4
(B) 1 to 3
(C) 1 to 2
(D) 4 to 7
(E) 2 to 3
-
18. The average (arithmetic mean) of 3 numbers is x . If one of the numbers is y , what is the average of the remaining 2 numbers in terms of x and y ?
- (A) $\frac{x}{3}$
(B) $\frac{2y - x}{3}$
(C) $\frac{2x - y}{3}$
(D) $\frac{3y - x}{2}$
(E) $\frac{3x - y}{2}$



19. A container in the shape of a right circular cylinder has an inside base radius of 4 inches and an inside height of 9 inches. This cylinder is completely filled with water. All of the water is then poured into a second right circular cylinder with a larger inside base radius of 9 inches. What must be the minimum inside height, in inches, of the second container?

(A) $\frac{4}{3}$
(B) $\frac{16}{9}$
(C) $\frac{9}{4}$
(D) 4
(E) 6

20. In the xy -plane, the graph of the function f is a line. If $f(2) = 7$ and $f(12) = 1$, what is the value of $f(7)$?

(A) 5.2
(B) 5
(C) 4.6
(D) 4
(E) 3.4

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.

SECTION 7

Time — 25 minutes

18 Questions

Turn to Section 7 (page 6) of your answer sheet to answer the questions in this section.

Directions: This section contains two types of questions. You have 25 minutes to complete both types. For questions 1-8, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. You may use any available space for scratchwork.

Notes

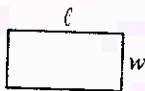
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Reference Information

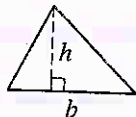


$$A = \pi r^2$$

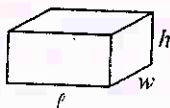
$$C = 2\pi r$$



$$A = \ell w$$



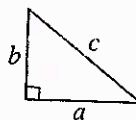
$$A = \frac{1}{2}bh$$



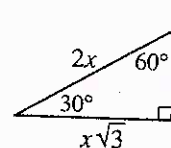
$$V = \ell wh$$



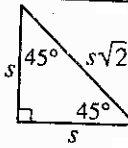
$$V = \pi r^2 h$$



$$c^2 = a^2 + b^2$$



Special Right Triangles



The number of degrees of arc in a circle is 360.

The sum of the measures in degrees of the angles of a triangle is 180.

1. For all positive integers x and y , let $\boxed{x|y}$ be defined

as $\boxed{x|y} = x + 2y$. What is the value of $\boxed{4|3}$?

- (A) 7
(B) 8
(C) 9
(D) 10
(E) 11

$$y = kx$$

2. In the equation above, k is a constant. When $y = 12$, then $x = 5$. When $y = 60$, what does x equal?

- (A) 10
(B) 17
(C) 25
(D) 53
(E) 144

GO ON TO THE NEXT PAGE

3. Which of the following numbers is between 0.499 and 0.500?

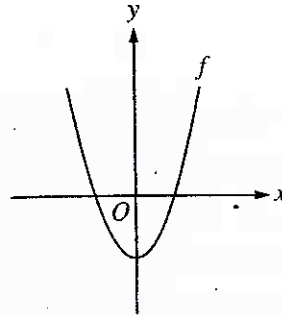
I. 0.4955
II. 0.4994
III. 0.5001

- (A) I only
(B) II only
(C) III only
(D) I and II
(E) II and III

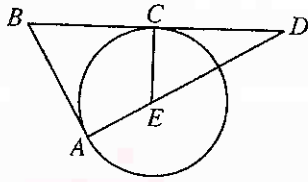
2, 6, 12, ...

4. The first term of the sequence above equals 1×2 , the second term equals 2×3 , and the third term equals 3×4 . In general the n th term of the sequence equals $n(n + 1)$. What is the 20th term minus the 19th term?

- (A) 2
(B) 38
(C) 40
(D) 42
(E) 400



5. The figure above shows the graph of the function f . If $g(x) = -f(x)$ for all values of x , which of the following is a true statement describing the graph of g in comparison with the graph of f ?
- (A) It is wider than the graph of f and opens upward.
(B) It is wider than the graph of f and opens downward.
(C) It is narrower than the graph of f and opens upward.
(D) It is narrower than the graph of f and opens downward.
(E) It has the same shape as the graph of f but opens downward.



6. In the figure above, line segments \overline{BD} and \overline{AB} are tangent to the circle at points C and A , respectively. If the circle is centered at E , what angle must have the same measure as $\angle ABD$?

- (A) $\angle BAD$
- (B) $\angle BCE$
- (C) $\angle CDE$
- (D) $\angle CEA$
- (E) $\angle CED$

YEAR	STUDENT POPULATION
1990	1,800
1992	2,050
1994	2,275
1996	2,525
1998	2,750

7. The chart above shows the student population at Johnston High School from 1990 through 1998. Beginning in 1990, the student population increased by a constant amount every 4 years. What was the student population in the year 2002?

- (A) 3,000
- (B) 3,225
- (C) 3,250
- (D) 3,500
- (E) 3,700

8. In $\triangle PQR$, $PQ = 4$, $QR = 3$, $PR = 6$, and the measure of angle PQR is x° . Which of the following must be true about x ?

- (A) $45 \leq x < 60$
- (B) $x = 60$
- (C) $60 < x < 90$
- (D) $x = 90$
- (E) $x > 90$

Directions: For Student-Produced Response questions 9-18, use the grids at the bottom of the answer sheet page on which you have answered questions 1-8.

Each of the remaining 10 questions requires you to solve the problem and enter your answer by marking the circles in the special grid, as shown in the examples below. You may use any available space for scratchwork.

Write answer in boxes. →

Answer: $\frac{7}{12}$

Grid in result. →

7	/	1	2
•	•	•	•
0	0	0	0
1	1	•	1
2	2	2	•
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
•	7	7	7
8	8	8	8
9	9	9	9

← Fraction line

Answer: 2.5

2	.	5
•	•	•
0	0	0
1	1	1
2	•	2
3	3	3
4	4	4
5	5	•
6	6	6
7	7	7
8	8	8
9	9	9

← Decimal point

Answer: 201
Either position is correct.

2	0	1
•	•	•
0	0	0
1	1	•
2	•	2
3	3	3
4	4	4

2	0	1
•	•	•
0	0	0
1	1	•
2	•	2
3	3	3
4	4	4

Note: You may start your answers in any column, space permitting. Columns not needed should be left blank.

- Mark no more than one circle in any column.
- Because the answer sheet will be machine-scored, you will receive credit only if the circles are filled in correctly.
- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- No question has a negative answer.
- **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If $\frac{311}{2}$ is gridded, it will be interpreted as $\frac{311}{2}$, not $3\frac{1}{2}$.)

- **Decimal Answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid. For example, if you obtain an answer such as 0.6666..., you should record your result as .666 or .667. A less accurate value such as .66 or .67 will be scored as incorrect.

Acceptable ways to grid $\frac{2}{3}$ are:

2	/	3
•	•	•
0	0	0
1	1	1
2	•	2
3	3	•
4	4	4
5	5	5
6	6	6

.	6	6	6
•	•	•	•
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	•	•	•

.	6	6	7
•	•	•	•
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	•	•	•

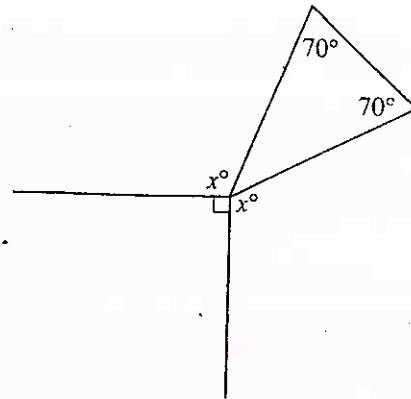
9. The amount of liquid that has been pumped from a tank after t minutes is $2t + t^2$ gallons. How many gallons of liquid have been pumped from the tank after 3 minutes?

10. If $\sqrt{x-6} = 2$, what is the value of $\sqrt{x+6}$?

GO ON TO THE NEXT PAGE

11. Of all the students in a high school, on a certain day $\frac{2}{3}$ rode the bus to school, $\frac{1}{6}$ rode in a car, and the remaining students walked. What fraction of the school's students walked to school on that day?

12. What is one possible value of x for which $2x < 2 < 3x$?

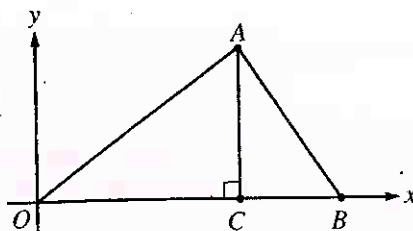


13. What is the value of x in the figure above?

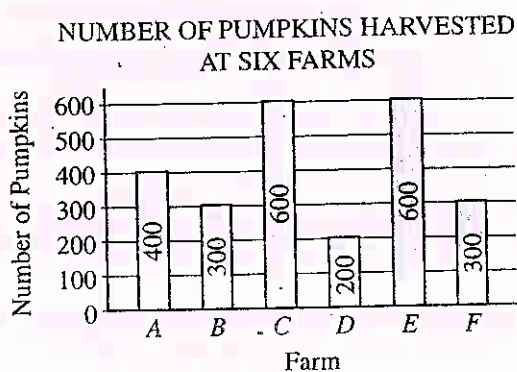
14. In an assortment of cereals, 23 types contain oats and 25 types contain rice. Some of these cereals contain both oats and rice. If 16 cereals in this assortment contain oats but not rice, how many cereals contain rice but not oats?

GO ON TO THE NEXT PAGE

15. If $a > 1$ in the equations $\frac{a^x}{a^y} = a^{-6}$ and $a^x \cdot a^y = a^{12}$, what is the value of y ?



17. In the xy -plane above, $\triangle OAB$ has area 9, the length of \overline{OC} is 4, and the coordinates of point B are $(6, 0)$. What is the slope of segment \overline{OA} ?



16. Based on the bar chart above, what is the total number of pumpkins harvested at those farms for which the number of pumpkins harvested was greater than the median number of pumpkins harvested at the 6 farms?

18. In the integer 3,589 the digits are all different and increase from left to right. How many integers between 4,000 and 5,000 have digits that are all different and that increase from left to right?

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.

SECTION 9
Time — 20 minutes
16 Questions

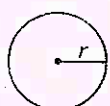
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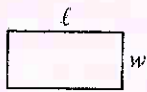
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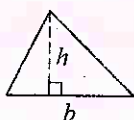


$$A = \pi r^2$$

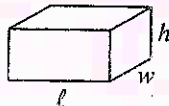
$$C = 2\pi r$$



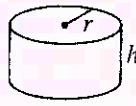
$$A = \ell w$$



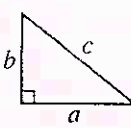
$$A = \frac{1}{2}bh$$



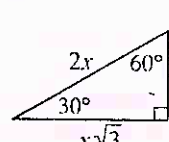
$$V = \ell wh$$



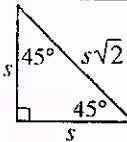
$$V = \pi r^2 h$$



$$c^2 = a^2 + b^2$$



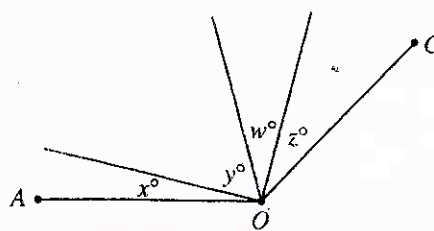
Special Right Triangles



The number of degrees of arc in a circle is 360.
The sum of the measures in degrees of the angles of a triangle is 180.

1. One hundred centimeters are equal to 1 meter, and 1,000 meters are equal to 1 kilometer. How many centimeters equal 1 kilometer?

- (A) 1,000
(B) 10,000
(C) 11,000
(D) 11,100
(E) 100,000



Note: Figure not drawn to scale.

2. In the figure above, the measure of $\angle AOC$ is 144° . What is the average (arithmetic mean) of x , y , w , and z ?
- (A) 24
(B) 32
(C) 36
(D) 44
(E) 48

GO ON TO THE NEXT PAGE

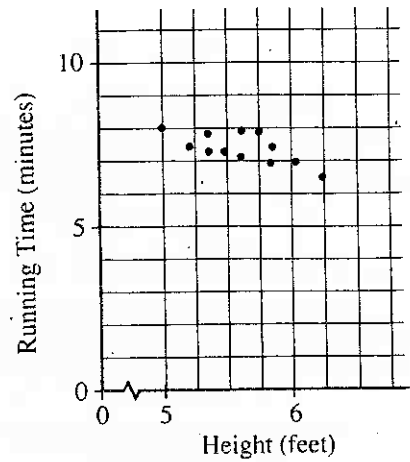


3. In the xy -plane, $y = 2x + 3$ and $y = mx + b$ are parallel lines. What is the value of m ?

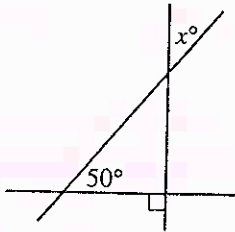
(A) $-\frac{1}{2}$
(B) $\frac{1}{3}$
(C) $\frac{1}{2}$
(D) 2
(E) 3

4. If $3x + 4 = 5$, what is the value of $6x + 7$?

(A) 8
(B) 9
(C) 10
(D) 11
(E) 13



5. Twelve people were asked to run a distance of 1 mile. The scatterplot above shows the height and running time for each of them. Which of the following is true about the line of best fit?
- (A) Its slope is positive.
(B) Its slope is negative.
(C) It goes through the point $(0, 0)$.
(D) It goes through the point $(0, m)$, where $m < 0$.
(E) It goes through the point $(p, 0)$, where $p < 0$.



6. In the figure above, three lines intersect as shown. What is the value of x ?
- (A) 40
(B) 45
(C) 50
(D) 55
(E) 60

8. In the xy -coordinate plane, the distance from point P to point $(1, 2)$ is 5. If the y -coordinate of P is 2, which of the following could be the x -coordinate of P ?

(A) 4
(B) 5
(C) 6
(D) 7
(E) 8

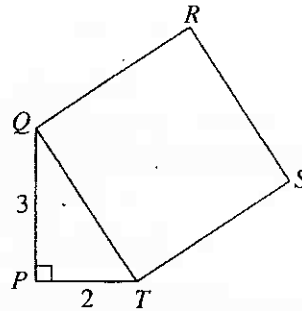
7. There are x books on a shelf. If one book is to be selected at random, the probability that a paperback will be selected is $\frac{3}{4}$. In terms of x , how many of the books are paperbacks?

(A) $\frac{x}{4}$
(B) $\frac{3x}{4}$
(C) $\frac{4x}{3}$
(D) $\frac{7x}{4}$
(E) $4x$



9. If $x > 0$ and 10 percent of x is equal to 30 percent of y , then 20 percent of x equals what percent of y ?

(A) 15%
 (B) 40%
 (C) 50%
 (D) 60%
 (E) It cannot be determined without knowing the exact values of x and y .



11. In the figure above, what is the area of square $QRST$?

(A) 11
 (B) 12
 (C) 13
 (D) 20
 (E) 25



10. A student practices the four musical notes above, starting with the note furthest left and continuing in order from left to right. If the student plays these notes over and over according to this pattern and stops immediately after playing the shaded note, which of the following could be the total number of notes played?

(A) 51
 (B) 53
 (C) 56
 (D) 58
 (E) 61



12. Barb's motor scooter has a 2-gallon gas tank and can travel m miles on 1 gallon of gas. If gas costs \$1.25 per gallon and Barb spends d dollars to fill the tank, which of the following represents the amount of gas, in gallons, that was in the tank before she filled it?
- (A) $\frac{2}{1.25}$
- (B) $\frac{d}{1.25} - 2$
- (C) $2 - \frac{d}{1.25}$
- (D) $2 - \frac{md}{1.25}$
- (E) $2 - \frac{\frac{m}{d}}{1.25}$
13. If $x^2 + kx + 15 = (x + t)(x + 5)$ for all values of x and if k and t are constants, what is the value of k ?
- (A) 8
- (B) 9
- (C) 10
- (D) 12
- (E) 15
14. The first of three numbers is 3 times the second number. The third number is 30 more than the second number. If the third number is represented by t and the sum of the first and second numbers is 180, which of the following equations could be used to find the value of t ?
- (A) $3t + t = 180$
- (B) $3t + (t - 30) = 180$
- (C) $3(t - 30) + t = 180$
- (D) $3(t - 30) + (t - 30) = 180$
- (E) $3(t - 30) + (t - 30) + t = 180$



15. In $\triangle PQR$, the length of side \overline{QR} is 12 and the length of side \overline{PR} is 20. What is the greatest possible integer length of side \overline{PQ} ?

(A) 9
(B) 16
(C) 25
(D) 27
(E) 31

16. On the number line, the distance between the point whose coordinate is a and the point whose coordinate is b is greater than 100. Which of the following must be true?

I. $a - b > 100$
II. $|a - b| > 100$
III. $|a| \cdot |b| > 100$

(A) II only
(B) III only
(C) I and II only
(D) II and III only
(E) I, II, and III

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.